Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE BRYOLOGIST.

VOL. IX. MARCH, 1906. No. 2.

FURTHER NOTES ON CLADONIAS. VI.
Cladonia cariosa.

BRUCE FINK.

As promised in the last paper of this series (BRYOLOGIST, **8**: 3, 1905.) we will consider *Cladonia cariosa* in the present one. And in so doing we shall depart somewhat from the views of Wainio regarding species. The method of making a specific description stand for a compound conception, such as a genus or a subgenus, is manifestly bad and allowable only when our studies will not enable us to make a closer analysis. Dr. Wainio has employed the method of deliberately recognizing compound species and then adding varieties which are supposed to cover all known forms, designating the varieties by various names prefixed by alpha, beta, etc. After so doing, he frequently has determined species for the present writer without referring to any one of his varieties. This is the case in the present species, the large majority of the specimens sent Dr. Wainio being simply returned as *Cladonia cariosa.* Thus it appears that after devising a uniform and cumbersome system, Dr. Wainio has by no means always found it best to follow it in the determination of specimens. The present writer has thus far followed the plan of the "Monographia Cladoniarum Universalis" in part, without reference to its objectionable features, but working on the supposition all the time that there is a real species, often with true varieties.

Oftentimes the study of our American forms has involved no difficulty, since species and varieties stand out distinctly enough, in other instances no varieties being recognized in our area. So no difficulty will arise in the use of this series of papers, except perhaps in *Cladonia fimbriata* and *Cladonia gracilis*, our most difficult species, of which an adequate exposition has not yet appeared. Regarding the last species, further study of specimens indicates that our paper left too much under the specific description. Indeed, it now appears plainly enough that Wainio's so-called variety *dilatata* is the prevailing form, standing at the centre of variation, and that it should stand for the species under the name *Cladonia gracilis* simply. *Cladonia fimbriata* is beyond us for the present, and we can offer no remedy. As to *Cladonia furcata*, it is not so certain whether the first variety, alpha, of Wainio's system, should stand for the species or not, but this seems probable. Regarding *Cladonia verticillata*, the variety *evoluta* would seem to be the species according to its position as assigned by Wainio. and the geographical distribution that he gives it as well. But so far as specimens seen from our territory are concerned, this is not the case, the plant plainly standing as a variety, and the form, with one or two exceptions, ranks as the species, as was given in our paper.

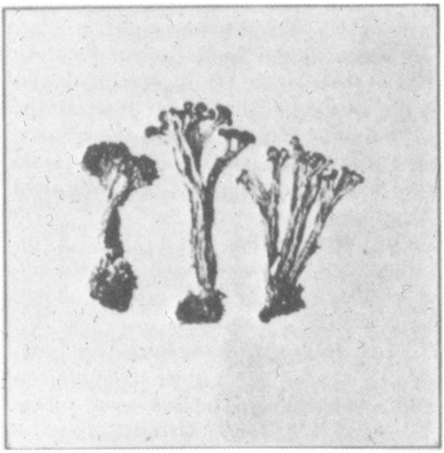
The January BRYOLOGIST was issued January 2d, 1906.

Concerning the present species, the variety alpha, *cribosa* of Wainio, is plainly the species, including nearly all specimens within our territory, and being the most common by far according to the distribution given it by Wainio. Also after looking through the species yet to be considered in this series of papers, it is apparent that there will be no difficulty in following the method inaugurated in the present paper, while the explanations given above regarding the species disposed of in previous papers of this series will clear up any difficulties, and enable workers to use this portion of the series in the same manner as the papers to follow.

The feeling that a change must be made has been growing as studies of the *Cladonias* have progressed, and defense for the procedure is ample. We may not be able often to ascertain elementary species by taxonomic methods, but we should at least make our systematic species conform as nearly as possible to the biological species. In so doing we must employ the parallelistic method of considering both form and function in the selection of our spectific marks, when two morphological characters are equally prominent, giving more prominence to the one that is more useful. Then, too, if we are ever to approximate to true species, we must use some definite criterion and come to some agreement as to chief differentials. The statistical method proposed by Davenport and Blankinship, in a recent joint paper, seems to the writer to contain much of suggestion. We must not be content to base our views on a few herbarium specimens, but modes or centres of variation must be established in the field, by examining a *multitude* of specimens, then we must determine ranges of variation and degree of isolation for various forms encountered before deciding upon the limits of species and varieties. And nowhere is this sort of study more necessary than in the variable and plastic *Cladonias*, By this method, a worker may established species and varieties in the areas studied with some degree of mathematical certainty. Then, by comparing results of such work in various regions, we may hope to establish world-wide conceptions of species of much greater value than those of the present time, discarding many of the "historical types," which are doubtless in many instances not true species, but varieties instead, and establishing true or "specific types." De Vries has given instances in which systemists have found the elementary species, or at least true biological species, as opposed to compound conceptions, and we may hope by proper methods to approximate and often realize such results.

While the results to follow in this series of papers must rest upon the study of herbarium material very largely, no pains will be spared to make the species and varieties recognized conform as nearly to true biological species as can be done.

CLADONIA CARIOSA (Ach.) Spreng. Linn Syst. Veg. 4: 272. 1827. Primary thallus persistent or replaced by new squamules, composed of irregularly laciniate, incised or crenate, concave, flat, involute or revolute, ascending or suberect, clustered or rarely scattered squamules, which are small or medium sized, 1–6 mm. long and 1–5 mm. wide, pale sea-green above, varying toward olivaceous, whitish below or brownish toward the base, the cortex continuous



or more or lessorediate above and along the margin. Podetia arising from the surface or margin of the squamules, 5–30 mm. long and 1–4 mm. in diameter, subcylindrical or thickened toward the top, cupless and always terminated by apothecia, usually freely branching and sometimes even from the base, the branches spreading or more usually suberect, the sides commonly more or less fissued or grooved, clustered or subsolitary, usually suberect, the cortex areolate and the areoles scattered, rarely squamulose toward the base, pale sea-green or whitish, the decorticate portions between the areoles whitish. Apothecia usually medium sized, 1–2 or even 4 mm. in diameter, clustered-conglomerate, frequently perforate, borne at the apices of the podetia, flat or becoming convex and immarginate, lighter or darker brown or possibly rarely reddish-brown. Hypothecium pale. Hymenium brownish above and pale or brownish below. Paraphyses simple or rarely branched, thickened and brownish toward the apex. Asci clavate or cylindrico-clavate,

On various soils and rarely on old wood; in open or more or less shaded places. Distributed throughout North America, but much more common toward the north, apparently being largely replaced toward the south by *Cladonia mitrula*, which will be considered in the next paper of this series. Examined by the writer from Massachusetts and Maine (Clara E. Cummings), South Carolina (H. A. Green, whose specimen was received under the name, *C. caespiticia*), Tennessee (W. A. Calkins, and determined as *C. subolescens* Nyl.), Iowa (Bohumil Shimek and Bruce Fink), Minnesota (Bruce Fink), Colorado (Baker, Earle and Tracy, originally determined as *C. symphycarpa*, but changed by Wainio), California (H. E. Hasse), Wyoming (Avon Nelson), and several localities in British America (John Macoun). J. W. Eckfeldt lists from Greenland, T. A. Williams from the Black Hills, Mrs. Carolyn W. Harris from Montana, and Henry Willey from Illinois. Following Tuckerman's Synopsis, Dr. Wainio's distribution would add Oregon, New Mexico, and two or three arctic or subarctic stations.

A number of specimens have come to the writer's herbarium from American localities, under the name *Cladonia symphycarpa* Fr., which was recognized as a distinct species by Tuckerman. Few of these specimens seen are in condition for determination, usually being without podetia, and though the squamules are frequently rather large, it seems probable that Wainio is right in assigning such material to the present species.

CLADONIA CARIOSA CORTICATA Wainio, Mon. Clad. Univ. **2**: 53. 1894. The cortex subcontinuous or partly areolate with the areoles contiguous.

Examined from Indiana (L. M. Underwood) and from Tacoma Park, D. C. (T. A. Williams). Also a peculiar form from Maine (G. K. Merrill) doubtless belongs here, though squamules are present at the tops of the podetia. The specimens seen are less branched than the usual forms of the species. Miss Clara E. Cummings also lists this variety from Alaska, and Dr. Wainio thinks that most of the forms given by Tuckerman under *C. symphycarpa* probably belongs here. Known also in Europe.

CLADONIA CARIOSA SQUAMULOSA (Müll.) Wainio Mon. Clad. Univ. **2**: 57. 1894. Squamules of the primary thallus somewhat elongated, and squamules present on the podetia. Cortex of podetia sometimes subcontinuous. Podetia sometimes simple.

A specimen sent by Prof. John Macoun, collected on the lower St. Lawrence, in Ontario, is this at least in part, squamules being quite numerous on some of the podetia, even to the top. Collected on humus over rocks. Known elsewhere only in Europe. Grinnell, Iowa.

MUSCI ACROCARPI BOREALI-AMERICANA.

(Prepared and Distributed by Prof. J. M. Holzinger.)

Prof. Holzinger has just issued the last fascicle of Century 11, of this interesting and valuable series. In the last two fascicles we note the following interesting species: *Oligotrichum parallelum* (Mitt.) Kindb. *Pogonatum erythrodontium* Kindb., *Fissidens Ravenelli* Sulliv., *Blindia acuta flexipes* R. & C., *Distichum inclinatum* (Ehrh.) Bry. Eur., *Grimmia glauca* Card., *G. Muhlenbeckii* Sch., *Rhacomitrium patens* (Dicks.) Hueb., *Scouleria marginata* E. G. B., *Barbula amplexa* Lesq., *B. Bakeri* Card. & Thér., *Pottia Nevadensis* Card. & Thér., *Aphanorhegma serratum* (Hook. & Wils.) Sulliv., *Orthotrichum papillosum* Hpe., *Schlotheimia Sullivantii* C. M., *Ulota phyllantha* Brid., *Timmiella anomala* (Bry. Eur.) Limpr., *Splachnum sphaericum* L., *Tayloria serrata* B. & S., *Pyramidula tetragona* Brid., *Bartramia glauco-viridis* C. M. & K., *Bryum Baileyi* Holz., *B. polycladum* Card. & Thér., *Rhizogonium spiniforme* Bruch.

Dr. J. W. Bailey and Mr. A. S. Foster in the Northwest, and Mr. Severin Rapp in Florida, are doing remarkably good work as collectors, and are adding extensively to our knowledge of the moss flora of their respective regions.

Several other members of the Sullivant Moss Chapter have contributed to Century 11, and it is safe to say that Prof. Holzinger's Exsiccati, as well as my own, have been very greatly indebted to the work of the Chapter. Mr. Rapp, living in one of the most interesting regions bryologically of all North America, is doing specially fine work.

To my own Exsiccati he has contributed such things as *Hookeria varians*, *Leptodon trichomitrion immersum*, *Pilotrichella cymbifolia*, *Papillaria nigrescens*, *Clasmatodon parvulus*, *Entodon Drummondia*, and others of equal interest. A. J. GROUT.